Breakout for Priority Action Plan 9 DR and DER Signal Semantics (updated)

Session Chair: David Holmberg

Leader: Marty Burns

Moderator: Grant Gilchrist

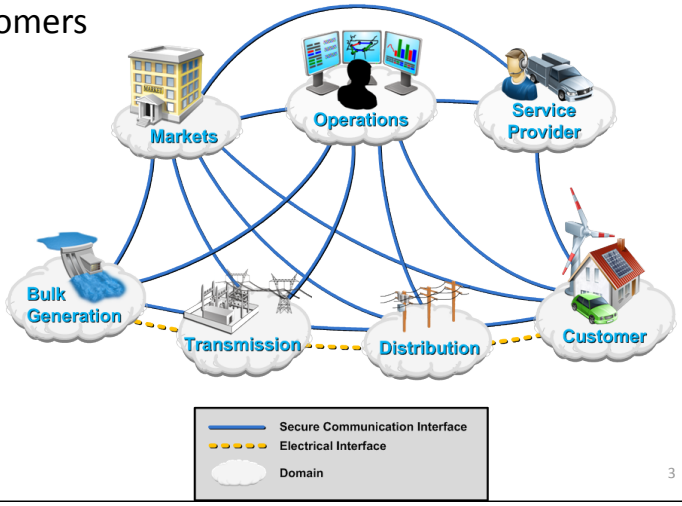
Agenda

- Call to Order
- Project Status
- Detailed Status Updates
- Discussion

2

Conceptual Model

- DR+DER signals primarily engage
  - Markets/Aggregators, Operations, Service Providers, and Customers



3

Participation & Details on PAP09

- From the PAP09 page
  - http://collaborate.nist.gov/twiki-sggrid/bin/view/SmartGrid/PAP09DRDER
  - Updated as needed; last revision date shown on page
- Participation in PAP03
  - http://collaborate.nist.gov/twiki-sggrid/bin/view/SmartGrid/PAP09DRDER#JoinList for info
  - Or send email to drderaction@nist.gov
  - Or sign up at one of the meetings

4

Efforts Related to PAP09

- NAESB Smart Grid Task Force
  - http://www.naesb.org/smart_grid_standards_strategies_development.asp
  - For notices: http://www.naesb.org/listserv/mail/listmanager.asp
  - Review of requirements ends ***2009-11-30***
    - http://www.naesb.org/pdf4/smart_grid_ssd111709reqcom.doc
- OASIS Energy Interoperation TC
  - http://www.oasis-open.org/committees/energyinterop
  - Questions on participation in the TC or OASIS: David Holmberg, William Cox or Toby Considine
  - General OASIS list—draft charters, discussion
    - Cox or Considine for info: smartgrid-interest@oasis-open.org

5

PAP 9 Tasks Identified

Task	Responsible	Date	Notes
Define proper DER Interaction, Scope	Lunch table discussion; later readout to Action Team List	Input before 2009-10	x2G DEWGs, IEC TC57. Storage Models IEEE1547.3, NAESB PAP07 Outcome, PAP11 Elec Trans
Collect, Analyze, and Consolidate Use Cases and deliver UML (inc DER)	UCAIug, NAESB	2009-10	Incorporating OpenADR (Starting point for OASIS EITC). No Magic.
Message Semantics Work DR	OASIS EITC	Underway	Starting from OpenADR. Review by UNCIug, , 1377, NAESB, BAE, SEP, TC57 CIM, Multispeak, others
Message Semantics Work DER	OASIS EITC	Convene by 2009-10	Input expected by 2009-10-31
Message Semantics Calendar, Price	OASIS EITC	2010-04	Output from PAP03, PAP04
Delver Semantics, Interactions for Initial review	OASIS EITC	2010-01	Leave hole for Price, Calendar
Downstream user requirements/engagement	LonMark, BACnet, ZigBee SEP2	2009-10	BACnet, LonMark, HES, x2G, UpnP, OpenHAN, ZigBee, SEP, oBIX, AHAM, UCAIug, NEMA
Additional message requirements for Distribution	MultiSpeak	2009-10	
Resale and process for safety and interconnection and resale	NAESB	2009-10	UL
Vocabulary	NAESB, UCAig, BACnet, LonMark	TWIKI ASAP 2009-09 to [UML]	Normalize OpenADR, NAESB, UCAIG, Place on TWIKI Deliver to OASIS EITC

6

Status Updates

- NAESB Requirements and Use Cases
  - Robert Burke
- ZigBee Smart Energy Profile 2 Update
  - Michael Stuber
- OASIS EMIX Technical Committee Update
  - Dave Holmberg

7

NAESB Smart Grid Task Force
PAP 09 Update

Taskforce Co-Chairs:

- **Robert B. Burke**
- **Wayne Longcore**
- **Brent Hodges**
- **Joe Zhou**

PAP 09 Description

- The semantics of Demand Response are generally well understood, but the information that is conveyed varies.
- Signals range from price, optionally with time of effectiveness, grid integrity, to proposed environmental signals (e.g. air quality).
- Defining consistent signals for Demand Response will make the information conveyed more consistent as a signal flows from grid management through aggregators to customers and within premises networks.
- Some of the standards define business processes, while others define XML or other data models with a variety of delivery mechanisms.
- The semantics for Distributed Energy Resources should fit into the same sort of signaling framework. This group will also develop a plan for DER signal definition.

9

PAP 09 Objectives

- Develop or adopt standard DR and DER signals – NIST shall organize a meeting with IEC TC57, OASIS, NAESB, and AMI-ENT to specify a process for developing a common semantic model for standard DR signals. The effort shall ensure DR signal standards support load control, supply control, and environmental signals.
- Define a framework and common terminology for:
  - Price communication,
  - Grid safety or integrity signals,
  - DER support, and
  - Other signals and/or an extensibility mechanism

10

NAESB SGTF Roles and Responsibilities

- For PAP09
- Per agreement reached during the NIST hosted meeting in early Oct. 2009 in DC. NAESB SGTF has the lead on the following responsibilities for PAP09:
  - Develop and standardize business and data requirements for DR Signals for both wholesale and retail markets.
  - Coordinate the implementation of the requirements across Standards Development Organizations for DR Signals :
    - OASIS
    - ZigBee Smart Energy Profile (SEP) 2.0
    - IEC TC57 WGs
- Support the use of IEC Common Information Model (CIM) as the basis for DR Signals information modeling and facilitate the process of incorporating extensions to IEC as part of future CIM.

11

NAESB TF Documents for Comment

- Informal Comment Period ends ***2009-11-30***
- Documents developed
  - Framework for Integrated DR and DER Models
    - Introductory document that lays out the entire arena
  - Wholesale DR Use Cases
  - Retail DR Use Cases
- Beneficial to distribute to the community at large for their review
- Encourage all stake holders to join or continue their participation

12

Framework for DR & DER Models

- We thank the following individuals for contributing to this Framework document development. We also thank many others that have provided constructive comments.
  - Albert Chiu, PG&E, AKC6@pge.com
  - Ali Ipakchi, OATI, Ali.Ipakchi@oati.net
  - Angela Chuang, EPRI, achuang@epri.com
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  - Joe Zhou, Xtensible Solutions, jzhou@xtensible.net
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  - Yarrow Etheredge, Entergy, yethere@entergy.com

13

Framework For DR & DER Signals

The key subjects and findings of this document are:

- DR signals standardization must support all four market types; i.e. regions with a) no open wholesale and retail competition, b) open wholesale market only, c) open retail market only, d) open wholesale and retail competition. It must also consider key differences that exist and will continue to exist in all four market types.
- Wholesale market DR and pricing signals have different characteristics than retail market DR and pricing signals, although commonality in format is feasible.
- Most Customers (with a few exception of Commercial and Industrial (C&I) Customers will not interact directly with wholesale market when it comes to DR and pricing signals.
- Retail pricing models are complex, due to the numerous tariff rate structures that exist in both regulated and un-regulated markets. Attempts to standardize DR control and pricing signals must not hinder regulatory changes or market innovations when it comes to future tariff or pricing models.
- New business entities (Energy Service Providers (ESP), Demand Response Providers (DRP), DR Aggregators, and Energy Information Service Providers (ESIP)) will play an increasing role in DR implementation.
- DER will play an increasingly important role in DR, yet the development of tariff and/or pricing models that support DER's role in DR is still in its infancy.
- The Customer's perspective and ability to react to DR control and pricing signals must be a key driver during the development of DR standards.

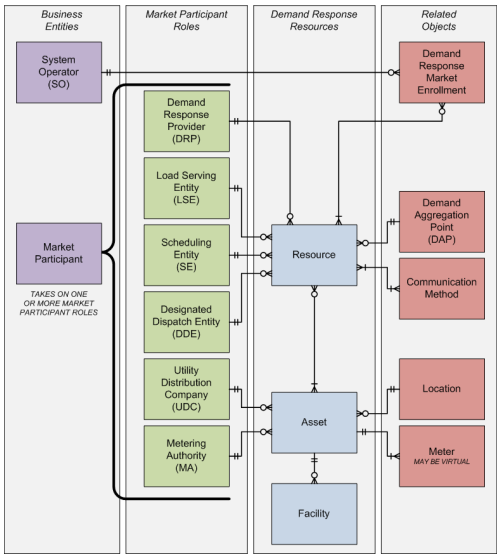
14

NAESB PAP 09 Timeline

Description	Date
Task force vote to release for informal comments (1st draft)	Nov. 13, 2009
Informal comments on 1st draft due	Nov. 30, 2009
Complete documents	Early to mid Jan. 2010
Task Force recommendation posted to NAESB web	Mid to late Jan. 2010
Task Force Vote to release for formal comment	Mid to late Jan. 2010
Formal comments due	Mid to late Feb. 2010
Single topic conference call with EC	Mid to late Feb. 2010
Address comments and send recommendation to EC	Mid to late Feb. 2010
EC vote	Late Feb. 2010

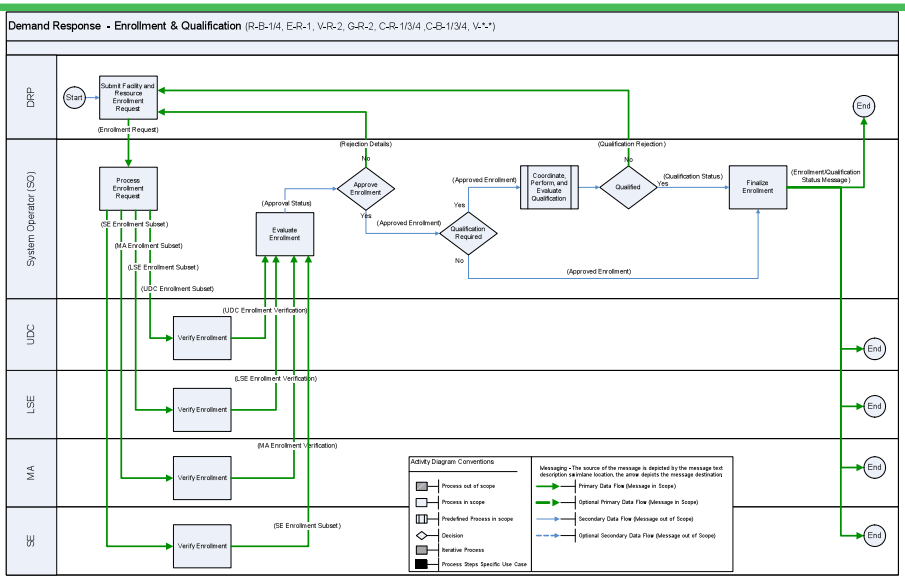
15

Wholesale Entity-Relationships



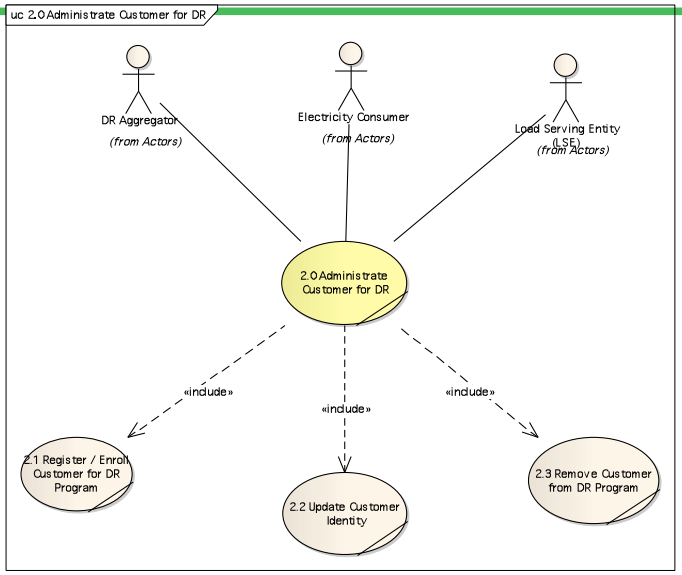
16

Sample Wholesale Use Case



17

Sample Retail Use Case

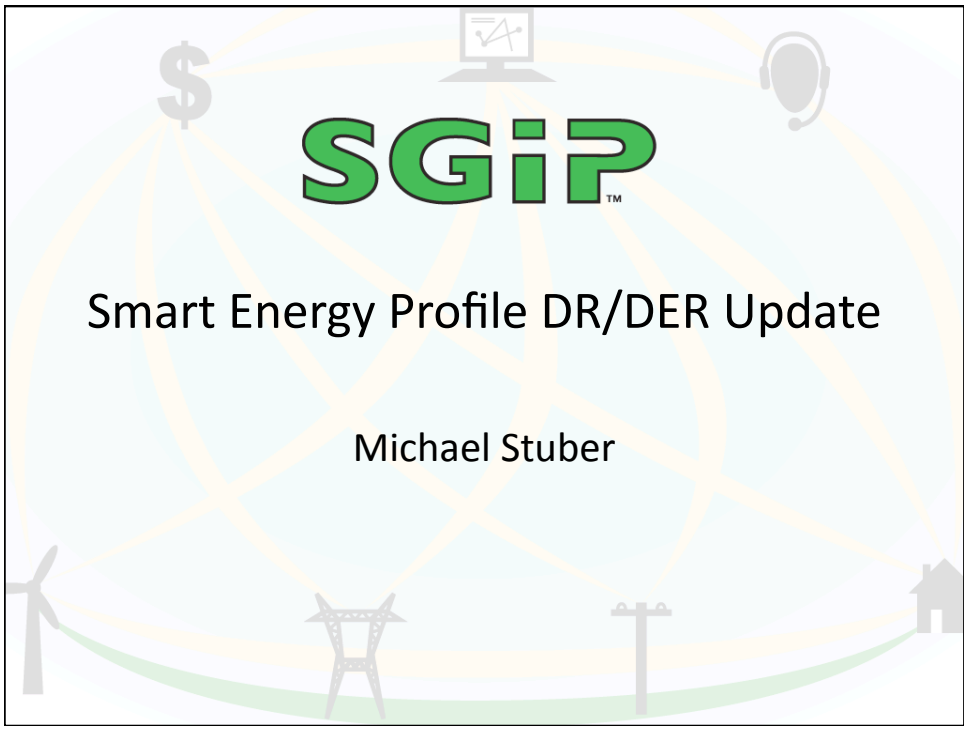


18

Next Steps

- Refine and add to both wholesale and retail use cases with consistent level of details and formatting.
- Examine the interactions between wholesale and retail markets, and focus on requirement for DR signals that go to the Customers.
- Include participants and views from all market types as defined in the Framework document.
- Determine final form of DR signals standard requirements specification.
- And we welcome and need your participation and contribution to the development of this standard.

19



Smart Energy Overview

- TRD activities and specification developments going on in parallel
- TRD running slightly behind schedule, but are aiming to finish by end of month
- Interoperability testing to begin in January (though not to application layer)
- RESTful approach to application data transfer (still debating exact protocol)
- EXI for message format

Outreach

Working with many, many others including:

- IEC TC57
- IEC TC13
- IETF (6LoWPAN, 6lowapp, etc.)
- SAE
- IEEE

DR & DER Updates

- SE 2.0 is CIM/61968 based
- Core DR/LC behavior isn't changing, but it is being mapped directly to the CIM
- Basic set of DER requirements has been defined
- On-going project by EPRI, working with energy storage and inverter manufacturers on SEP integration
  - Goal is to use 61850 DER objects
  - Harmonize with CIM
  - Integrate into SE 2.0

DER Requirements

ESI to permit monitoring and control of distributed generation

ESI to permit utility on monitoring and control of distributed generation

In order for utility to control DER as a HAN device, the following application-level requirements need to be met:

- Accept control signals from the Utility.
- Respond to requests to cease and resume operational state.
- Acknowledgement on receipt of control signal, execution of control request, and execution failure of request (i.e., exceptions).
- Signal any consumer-initiated overrides.
- Respond to request to cease and resume operation state at a specific time.
- Delay restoration of operational state based on a pre-configured time (e.g., random number).
- Respond to request to cycle operational state (i.e., duty cycle), to limit operational mode based on thresholds, set-points, or triggers (e.g., price points), and for variable output (e.g., load limiting, energy savings mode)

DER Requirements

Shall support providing state of charge information to the Utility for dispatching purposes, through ESI

Shall support providing state of charge information to the premise for consumer communications purposes

Data requirements regarding of measurement and monitoring from DER perspective:

- Generation production per interval (e.g., Wh)
- Energy state (e.g., state of charge, Watt-hour)
- Device state (e.g., operational, stand-by, maintenance)
- Environmental state (e.g., temperature, motion, wind)
- Available capacity and threshold (e.g., Watts, Volt-Amps)
- Operational mode (e.g., charging, discharging)
- Power quality (e.g., frequency, neutral voltage, harmonic content)

OASIS Energy Interoperation Technical Committee Update

David Holmberg

OASIS Energy Interop TC

- OASIS Energy Interoperation TC formed mid-2009
- Technology base is portions of OpenADR 1.0
  - From Lawrence Berkeley Labs California Energy Commission Report
- Work in progress.
  - All OASIS work visible on the home page
    - http://www.oasis-open.org/committees/energyinterop
  - Participation welcome
    - Contact David Holmberg, William Cox, or Toby Considine

27

Discussion Points

- Cross connections
  - Target SDOs, other groups, PAP03, PAP04, PAP07, PAP11
- Improvements
- Adjustments Summary
- Next Steps

28